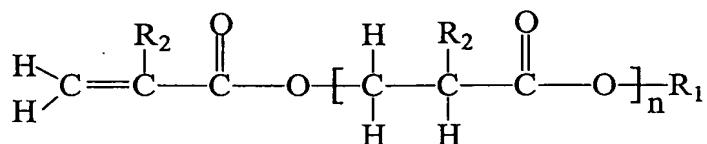


Amended Claims

1. A process for splitting of a (meth)acrylic acid oligomer of structure I

5



I

wherein

R_1 is a hydrogen atom or a C_1 to C_{10} alkyl groups

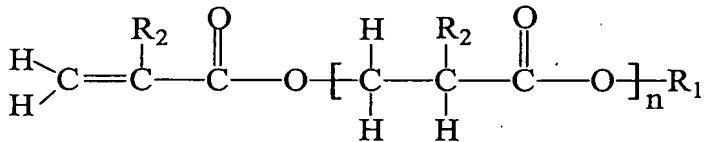
10 R_2 is a hydrogen atom or a methyl group, and

n is a whole number within the range between 1 and 200,

wherein the (meth)acrylic acid oligomers are heated to a temperature of at least 50°C at a pressure of at least 10 bar.

15

2. Process for splitting of a (meth)acrylic acid oligomer of structure I

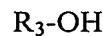


I

wherein

R₁ is a hydrogen atom or a C₁ to C₁₀ alkyl groups
R₂ is a hydrogen atom or a methyl group, and
n is a whole number within the range between 1 and 200,
with a splitting agent of structure II

5



or of structure III

10 (R₄)₂-N-H

wherein

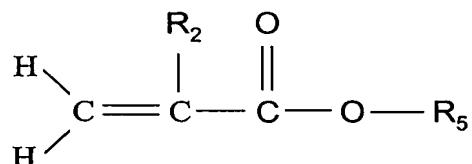
15 R₃ is a hydrogen atom, a C₁ to C₁₂ alkyl group, or a -C_xH_{2x}-OH group,
wherein x is a whole number within a range from 1 to 12, and

R₄ is a hydrogen atom or a C₁ to C₁₂ alkyl group, with the proviso that not
both R₄ groups are hydrogen atoms,

20 wherein the (meth)acrylic acid oligomer is brought into contact with the
splitting agent at a temperature of at least 50 °C and at a pressure of at
least 10 bar.

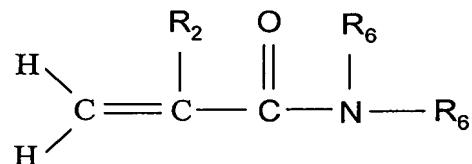
3. Process according to claim 2, wherein the splitting agent and the (meth)acrylic acid oligomer are used in a weight ratio splitting agent : (meth)acrylic acid oligomer within a range from 0.01 : 1 to 10 : 1.
- 5 4. Process according to one of claims 2 or 3, wherein the splitting agent is water, ethanol, n-butanol or a mixture of at least two of these compounds.
5. Process according to any one of the preceding claims, wherein by means of the splitting a compound of structure IV

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or of structure V

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is separated,

wherein

R₆ is an H atom or a C₁ – C₁₂ alkyl group, with the proviso that not both R₆ groups are hydrogen atoms,

R₅ is an H atom, a C₁ – C₁₂ alkyl group or a –C_xH_{2x}-OH- group, whereby x is a whole number within a range from 1 to 12, and

5 R₂ is an H atom or a methyl group.

6. Process according to any one of the preceding claims, wherein the (meth)acrylic acid oligomers are used in the form of a composition, which is obtained as bottom product of the distillative work-up of the 10 (meth)acrylic acid solution in process step iii) during the process for (meth)acrylic acid synthesis comprising the process steps

- i) catalytic oxidation of C₃ or C₄ starting compounds in the gas phase,
- ii) absorption or condensation or both of the formed (meth)acrylic acid in water, and
- 15 iii) work-up of the thus-obtained aqueous (meth)acrylic acid solution by distillation.

7. Process according to any one of the preceding claims, wherein the (meth)acrylic acid oligomers are used in the form of a composition which is obtained as mother liquor during the purification by crystallisation in process step IV) during the process for (meth)acrylic acid synthesis comprising the process steps

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- I) catalytic oxidation of C₃ or C₄ starting compounds in the gas phase,
- II) absorption or condensation or both of the formed (meth)acrylic acid 25 in water to form an absorption product,

III) optionally, work-up of the thus-obtained aqueous (meth)acrylic acid solution by distillation, and

IV) purification by crystallisation of the absorption product or of the concentrated (meth)acrylic acid solution obtained by distillation or of both.

5

8. Process according to any one of claims 2 to 7, wherein the (meth)acrylic acid oligomer is brought into contact with the splitting agent at a temperature of at least 250 °C.

10

9. Process according to any one of the preceding claims, wherein the splitting occurs in the presence of a catalyst.

15

10. Use of compounds of structure II or of structure III, as defined in claim 2, as splitting agent for splitting of (meth)acrylic acid oligomers of structure I at a temperature of at least 50 °C and at a pressure of at least 10 bar.

20

11. Device for production of (meth)acrylic acid comprising as components connected with each other in fluid-conducting fashion a (meth)acrylic acid synthesis unit, a quench absorber, a distillation device and/or a crystallisation device, as well as a (meth)acrylic acid oligomer splitting device, wherein the (meth)acrylic acid oligomer splitting device comprises a splitting agent reservoir (6), at least one first and one second conveyor unit, a mixing device (5), a heating device (10), a splitting reactor and at least a first to fifth conduit, wherein

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- (β1) a reactant pump (4) as the first conveyor unit comprises a feed line, which conducts a composition comprising a (meth)acrylic acid oligomer as defined in claim 1 or 2;
- 5 (β2) the splitting agent reservoir (6) is connected by a splitting agent line (7) as first conduit to a splitting agent pressure pump (9) as second conveyor unit;
- (β3) the first and the second conveyor unit (4, 9) are connected to the mixing device (5) by a second and third conduit;
- 10 (β4) the mixing device (5) is connected to the heating device (10) by a fourth conduit;
- (β5) the heating device (10) is connected to the splitting reactor by a fifth conduit,

wherein the oligomer splitting device comprises a release valve (12), by means of which the splitting product of the (meth)acrylic acid oligomer splitting situated in the heating device (10) can be expanded.

12. Device according to claim 11, wherein the composition which is conducted in the feed line to the first conveyor unit corresponds to the composition defined in claim 6.
- 20 13. Device according to claim 11, wherein the composition which is conducted in the feed line to the first conveyor unit corresponds to the composition defined in claim 6 or 7.

14. Use of a device according to any one of claims 11 to 13 for production of (meth)acrylic acid.